

IN THE FIGURES:

In response to the Examiner's comment during the Telephone Interview, and as indicated in the Interview Summary Record, Applicants submit herewith three figures showing (a) what is meant by "inward narrowing spiral" and (b) "a penetration sensor which senses the formation of the protrusion" as recited in claim 7, subparagraph (b).

Upon approval of these informal drawings, Applicants will obtain formal drawings.

REMARKS

Status of Claims

Claims 1-7 and 10 were pending in the application following Amendment D.

In order to isolate the issue of new matter, Applicants herewith amend independent claims 1 and 3 to claim at least one topographic change being formed on the side of the coated sheet opposite to the laser (this being free of the new matter issue). Independent claim 7 already required the topographic change to be formed on the side of the coated sheet opposite to the laser, so claim 7 is amended to dependent form, depending from claim 1.

To separately address the new matter issue, Applicants add new claim 11 reciting that the topographic change is formed on the same side of the coated sheet as the laser. A detailed discussion of support for claim 11 is presented below.

The revision of the claim to recite that the vaporization products escape “via” the gap rather than “into” the gap is more correct, and support can be found in the abstract “narrow gaps between the sheets can be produced by means of spacers, *through* which the coating material can escape.”

Amendments following Telephone Interview

In the Telephone Interview of May 19, 2010, Applicants submitted that Amendment D overcame all rejections and placed the application in condition for allowance.

In Amendment D the advances in machining represented by the present invention are explained and the prior art is distinguished.

However, during the course of the interview, additional issues were identified, resulting in this RCE.

More specifically, Applicants explained that the present invention, by describing a narrowing spiral, would cause a large area of the sheet to melt and sag in the middle to form a projecting spacer on the side opposite the laser, or, like a snow plow describing a narrowing spiral from outside to inside, would result in a large pile of snow in the middle of the cleared area.

Applicants explained that they had conducted comparative experimentation (Amendment C, page 7) and demonstrated that the stationary laser of Fujimoto only forms a pinpoint (dot) projection, which does not achieve much height, while the decreasing spiral of the present invention, involving the deformation of a larger area, forms a spacer much larger

in cross section and greater in height than Fujimoto, smoother in shape and less likely to be crushed, and thus better able to allow venting of vaporized coating.

The Examiner said that (a) a decreasing spiral is shown in Dunskey, and (b) a decreasing spiral can go from inside to outside as well as outside to inside.

Applicants explained that (a) Dunskey begins at the center, and must begin at the center, to vaporize the metal while drilling a hole through the sheet. If Dunskey were to begin at the outside, then a "button" of material would be cut out, falling into the hole, creating solid residue, interfering with the process. Regarding (b) Applicants could not understand the position of the Examiner.

The Examiner explained that, to him, "narrowing spiral" means that the distance between adjacent rings on the spiral decreases. So, an inward narrowing spiral means that the rings become smaller going towards the inside, while an outwardly decreasing spiral means that the rings become smaller going from inside to outside.

Applicants explained that this is not what was meant in the specification. Applicants referred the Examiner to paragraph [0019] of the specification as filed, which indicated that an even topographical change resulted from the spiral movement from outer to inner.

The Examiner indicated that if the claims were clarified to limit the spiral to go from outside to inside, this would be a patentable feature.

Applicants proposed to amend "guiding the laser beam to describe a narrowing circle" to "guiding the laser beam to describe an inwardly narrowing circle". This did not mean that the distance between spirals decreased, it merely meant that the radius of the spiral decreased at each orbit.

The Examiner agreed that this would distinguish over the art of record.

Next, the Examiners asked if the new matter rejection with regard to the language "preventing explosive vaporization" had been addressed.

Applicants pointed out that the problem of vaporization of coating material from between sheets during welding, and the associated danger of explosive vaporization, was old, and that the provision of spacers to solve the problem was old, but the present inventors developed a new way to make spacers in a short time. Nevertheless, Applicants had changed the language to "permit vaporization products ... to escape" and this was found acceptable by the Examiner.

Applicants next proposed one more minor change to claim 1. Since "wherein the topographical change protrudes from the coated surface a height sufficient to ..." might be misinterpreted to mean that the topographical change is located on a coated area, Applicants would like to delete the word "coated". The Examiners agreed that this would clarify the claim.

The Examiner next indicated that the specification was difficult to understand without drawings, and that drawings would be required.

Applicants agreed to provide drawings.

The Examiner then asked where in the specification there was explicit discussion of the topographical change being formed on the same side of the sheet as the laser.

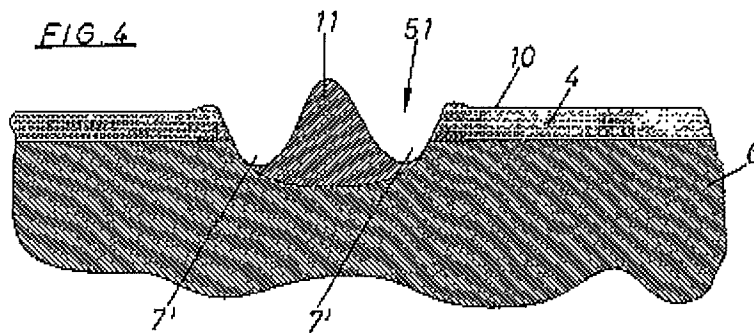
This raised an issue of new matter, necessitating the present RCE.

Accordingly, Applicants have amended the claims such that claims 1-10 have the topographical side formed on the side opposite to the laser, for which there is no issue of new matter, and present new claim 11, for which support is as discussed below.

Applicants first refer the Examiner to paragraph [0002] of the specification as published: "[0002] The invention relates to a method for the laser machining of coated sheets, according to the preamble of patent claim 1. A method of this type is already known from DE 44 07 190 A1." Figure 4 of this reference shows a topographical change formed on the same side of a coated sheet as the laser:

Fig. 5 dargestellten Scanneroptik 8 erreichen. **Fig. 4** 55
zeigt eine Oberflächenstruktur 51, bei der eine Erhebung 11 vorhanden ist, die über die Werkstückaußenfläche 10 vorsteht. Eine solche Erhebung läßt sich nach einem Verdampfen des Beschichtungswerkstoffs 4 durch Aufschmelzen des Grundwerkstoffs 6 erreichen, 60
z. B. mit einer in **Fig. 6** dargestellten Zylinderoptik 12.

This translates as "Fig. 4 shows a surface structure 51, in which a rise 11 is present, which projects above the workpiece outer surface 10. Such a rise can be achieved after vaporization of the coating material 4 by melting of the base material 6, for example, with a cylindrical lens 12 shown in Fig. 6."



Accordingly, the specification indicating that the present invention is in the field of art as disclosed in DE 44 07 190 A1, it follows that the present invention was intended to include a surface projection on the same side of the sheet as the laser.

The present invention differs from DE 44 07 190 A1 in that the prior art reference does not teach forming of spacer elements by guiding a laser to form an inwards narrowing spiral. Rather, the above cross sectional profile is produced by producing side-by-side short furrows 71.

Further, Claim 1 of the PCT application of which the present application is a translation, as filed, recites:

“.... characterized

- in that the laser beam generates the at least one topographical change on that side of the at least one sheet which faces away from said beam, by continuously fusing this sheet in the region of its machining area, and/or
- in that the laser beam describes about the center of its machining area a narrowing spiral”

This can be written as:

.... characterized

- 1.) in that the laser beam generates the at least one topographical change on that side of the at least one sheet which faces away from said beam, by continuously fusing this sheet in the region of its machining area, or
- 2.) in that the laser beam generates the at least one topographical

change on that side of the at least one sheet which faces away from said beam, by continuously fusing this sheet in the region of its machining area and in that the laser beam describes about the center of its machining area a narrowing spiral, or

- 3.) in that the laser beam describes about the center of its machining area a narrowing spiral

This aspect of the topographical change on the same side as the laser is also disclosed on page 4, lines 11 - 17 of the PCT application:

It is also advantageous if the laser beam is guided by the scanner device in such a way that it describes about the center of its machining area a narrowing spiral. This allows, especially in the case of shoot-through machining, more even fusion and cooling processes and thus the formation of a topographical change in the form of an evenly contoured elevation.

This means the laser beam describing a narrowing spiral can advantageously be used in two cases

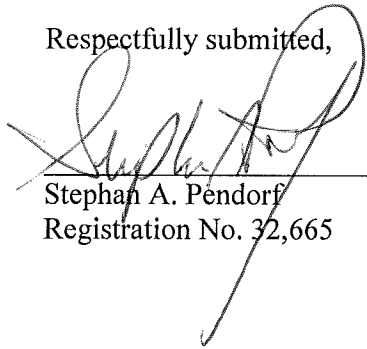
- especially in the case of shoot-through machining, i.e. aspect 2.)
- not especially in the case of not-shoot-through machining, i.e. aspect 1.)

Accordingly, withdrawal of the rejection and early issuance of the Notice of Allowance is respectfully requested. Should further issues remain, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.

The Commissioner is hereby authorized to charge any fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account Number 16-0877.

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Respectfully submitted,



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